Research at the Aquaculture Centre of Excellence (Lethbridge)

The Aquaculture Research group of Alberta Agriculture and Forestry works in close collaboration with the Lethbridge College Aquaculture Centre of Excellence (ACE). Aquaponic research at the ACE is multi-faceted and has recently benefitted from funding provided by the Natural Sciences and Engineering Research Council (NSERC):

- **Vermicompost Production:**
  In 2014 ACE began looking at the linkage between vermicompost production and aquaponics. A large vermicompost system was acquired locally and a cooperative agreement established between ACE and the Culinary Department at Lethbridge College. All the green-waste from the cafeteria is now collected and composted at ACE. With the addition of other carbon waste products around around campus (paper, sawdust) ACE now processes approximately 70Kg of campus green waste per week creating a rich by-product of vermicompost and approximately one pound of worms per week. The vermicompost now is utilized in seedling production and has been brewed into a "tea" to use for hydroponic nutrients. The microbial based nutrient solution has shown promising results in plant growth trials. Likewise, the castings used for seedling production now eliminates the need for addition fertilizer inputs during the early stages of plant development.

- **Seedling Production:**
  Rockwool seedling cubes have conventionally been used at Lethbridge College. For many reasons, rockwool is not a sustainable source for starting seedlings so Lethbridge College has started to look at other methods including the use of coconut coir and worm castings produced from the ACE vermicompost project. Seedling media mixes now include coir, vermiculite and worm castings, allowing for good root development without the need for additional fertilization to produce exceptional seedlings to be used in a variety of aquaponic systems.

- **Seed Production:**
  Recently, trials were conducted to produce seeds from aquaponic lettuce crops in an attempt to improve the cultivars for hydroponic production. Seeds were saved from two varieties of lettuce grown in the DWC systems and will be tested for viability and will be re-grown and seeds generated again from the next generation. The project was funded through an Organic Alberta grant and excess seeds will be available to other aquaponic growers in the region.

- **Cold Water Aquaponic Research:**
  Limited research has been conducted using coldwater fish species linked to aquaponic plant production, primarily due to the sub-optimal water temperatures for the production of tropical vegetables. Growth rates of hydroponic vegetables slow down when the culture water is chilled to temperatures ideal for fish species such as trout, salmon or char. Producers of these high value fish will have to identify a crop mix that grows well under these low temperature conditions, while generating income that can sustain that production systems. Lethbridge College in initiating some of this research currently, linking Rainbow Trout production with wasabi, a cool-water, high value crop. Additionally, cold water

effluents may be digested to release dissolved nutrients while heating up the nutrient solution in the process allowing for production of warm-water vegetables.

- **New Fish Species:**
  Barramundi (*Lates calcarifer*) has recently been added to the approved fish species list for aquaculture production in Alberta. Before the fish are released to Alberta producers they will have to go through a quarantine period at where the fry will be evaluated for risk of disease introduction, and Lethbridge College is one of the facilities where this will take place. This high-value fish species may provide aquaponic producers with a new product and may improve the economic potential of existing aquaponic facilities. Ongoing production trails will include identification of aquaponic crops that are best suited for production in the barramundi water.